

June 30, 1999

Harry A. Andreas
Raytheon Systems Company
PO Box 92426
RE, Bldg. R1/MS B500
Los Angeles, CA 90009-2426

Dear Mr. Andreas,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement).

The BRC agrees that the information contained in clause 4.1.8, "Printed circuit board footprints", does not constitute a requirement. Instead of removing the clause, the text has been modified to clearly show that these are recommended, not mandatory. Note that informative annex I in IEEE Std 1394-1995 provided examples of PCB footprints. The BRC believes that examples continue to be useful to designers and made an editorial choice to locate the examples in section 4 rather than a separate annex.

I hope the changes satisfactorily resolve your comments and look forward to your participation in the recirculation ballot for P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Steven Bard
16510 NE 13th Street
Vancouver, WA 98684

Dear Mr. Bard,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

The BRC believes that in addition to clarifying that the consuming node shall avail itself of no more than 1.5 A of cable power that the power supplying node shall be constrained on a *per port* basis according to agency requirements (in the United States the nominal limit is believed to be 3 A). Table 7 1 was updated to reflect this new requirement.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Catherine Berger
Institute of Electrical and Electronic Engineers
PO Box 1331
445 Hoes Lane
Piscataway, NJ 08855-1331

Dear Ms. Berger,

Thank you for your editorial review of the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your comment:

The word "abbreviations" has been removed from the title of section 2.

The editor is gratified that, with the above exception (now corrected), draft standard P1394a meets with SCC 10 approval.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Janos Biri
Central Research Institute for Physics
KFKI-MSZKI
PO Box 49
Budapest, H-1525, Hungary

Dear Mr. Biri,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). Your careful reading of the draft is appreciated. Other than the exceptions noted below, all of your comments are accepted and incorporated into the forthcoming draft for the recirculation ballot.

I demur with respect to your suggestion that "Eight bytes, or 64 bits, of data" is better worded as "Eight bytes of data or 64 bits of data." I think the latter construction is verbose;

The present usage of "interconnect" as a gerund is acceptable; and

The spelling "labeled" reflects contemporary usage and is preferred over the alternate form "labelled."

In all of the above cases I will defer to the IEEE Project Editor when the draft is prepared for final publication.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Donald M. Chambers
JAE Electronics
142 Technology Drive
Suite 100
Irving, CA 92718-2401

Dear Mr. Chambers,

Thank you for your comment, for information, on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement).

The BRC agrees that the information contained in clause 4.1.8, "Printed circuit board footprints", does not constitute a requirement. Instead of removing the clause, the text has been modified to clearly show that these are recommended, not mandatory.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Claude A. Cruz
Intel Corporation
2111 NE 25 th Ave, MS JF3-202
Hillsboro, OR 97124

Dear Mr. Cruz,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to one of your comments:

The BRC believes that in addition to clarifying that the consuming node shall avail itself of no more than 1.5 A of cable power that the power supplying node shall be constrained on a *per port* basis according to agency requirements (in the United States the nominal limit is believed to be 3 A). Table 7 1 was updated to reflect this new requirement.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

John Fuller
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Dear Mr. Fuller,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your comment on the *generation* field in the bus information block, the BRC accepts the intent subject to the editorial changes to clause shown below.

The *generation* field is used to indicate changes in configuration ROM. Devices that comply with IEEE Std 1394-1995 (but not with this standard) shall report a value of zero for the *generation* field. Devices compliant with this standard whose configuration ROM never changes (so long as the device's link is continuously active) shall set the *generation* field to one. All other devices compliant with this standard shall set the *generation* field to a value between two and F_{16} , inclusive. For these devices, upon the detection or initiation of a bus reset, the *generation* field shall be modified if any portion of configuration ROM has changed since the prior bus reset. The updated value of the *generation* field shall not be equal to any values assumed by the field within the preceding 60 seconds. Configuration ROM includes not only the first kilobyte of ROM (quadlets in the address range $FFFF\ F000\ 0400_{16}$ through $FFFF\ F000\ 07FC_{16}$, inclusive) but any directories or leaves that are indirectly addressed from the first kilobyte. The CRC in the first quadlet of configuration ROM shall be recalculated each time the *generation* field is updated.

NOTE— The *generation* field is usually incremented upon a change to configuration ROM; the value wraps from F_{16} back to two. If an update would result in a value used within the last 60 seconds, the device should defer any changes to configuration ROM until the requisite 60 seconds have elapsed.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

David B Gustavson
SClzzl
1946 Fallen Leaf Lane
Los Altos, CA 94024-7206

Dear Mr. Gustavson,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). Other than as noted below, your comments are accepted by the BRC.

The recommendation that *resp_type_error* be the preferred response when "protected" addresses are referenced is accepted; the text below is added to clause 9.5.4:

A request packet is received with valid *tcode* and *extended_tcode* values, but the referenced address does not accept the indicated request from the node identified by *source_ID*. This situation may arise when a higher-level protocol requires a login to establish a requester's identity before subsequent requests are accepted.

Recommended error responses for request described by comments 1b and 1c are already described in P1394a Draft 2.0 (see clause 9.5.5). The BRC believes that *resp_address_error* is a correct response in both cases:

A block request packet is addressed to a valid *destination_ID* but the combination of the *destination_offset* and the *data_length* reference addresses some of which are not implemented by the node.

A BRC discussion of your proposal that a constant value to be substituted for invalid data CRC in an isochronous packet (stomped CRC) yielded no consensus. The argument in favor of the diagnostic usefulness of such a value was not sufficiently strong to mandate the proposed behavior;

The BRC agrees with the intent of your comments on dual-phase retry and the suspend / resume process, but you have provided no concrete remedies. For this procedural reason we cannot accept these comments. However, others have made specific suggestions which the BRC has accepted. If you review the changes in the forthcoming draft for the recirculation ballot, the BRC is optimistic that you will find your concerns satisfactorily resolved.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Eric Hannah
Intel Corporation
MS: RN 4-76
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

Dear Mr. Hannah,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

The BRC believes that in addition to clarifying that the consuming node shall avail itself of no more than 1.5 A of cable power that the power supplying node shall be constrained on a per port basis according to agency requirements (in the United States the nominal limit is believed to be 3 A). Table 7 1 was updated to reflect this new requirement.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Jerry Hauck
Zayante, Inc.
1580 Washington Boulevard
Fremont, CA 94539

Dear Mr. Hauck,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

The BRC believes that the intent of your comments with respect to the LinkOn signal and indication of PHY interrupts has been effected by clarifications in clauses 5.2 and 6.1, as well as in the C code in section 7. Since the power reset value of *Resume_int* (renamed *Watchdog* in the forthcoming P1394a draft) is zero and it controls the assertion of LinkOn in the event of a loop, power failure or timeout condition, your concerns about inadvertent activation of a power-consuming link are satisfied.

The C code, notably `reset_start_actions()`, already specifies the values of the PHY register fields subsequent to a bus reset. A comment has been added above table 6-1 to refer the reader to the PHY state machines and C code;

You requested clarification with respect to the use of priority arbitration in place of a node's first fair arbitration request within a fairness interval. The text in clause 9.15 below table 9-7 has been changed as shown below:

Each time a link receives PHY status of ARB_RESET_GAP, it shall reset an internal variable, *priority_request_count*, to the value of *pri_req*. The link may use priority asynchronous arbitration for any of the transaction codes specified by table 9-6 so long as *priority_request_count* is nonzero. The link may also issue a single priority arbitration request in place of a fair arbitration request if no fair arbitration request has been granted within the current fairness interval. Even if either of those two conditions is met, if a node receives an *ack_busy_X*, *ack_busy_A* or *ack_busy_B* in acknowledgment of a request subaction, the node shall not retransmit the request packet until the next fairness interval. Each time a priority arbitration request is granted for one of the transaction codes specified and *priority_request_count* is nonzero, the link shall decrement *priority_request_count*.

Although no suggested resolution accompanied your ballot comments about gap count values, the BRC is indebted to the work both you and Jim Skidmore ultimately provided to correct the informative procedures for the proper determination of `gap_count` in annex clause C.2.

All other comments have been accepted subject to editorial modification.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Burke Henehan
Texas Instruments
PO Box 742165
Dallas, TX 75374-2165

Dear Mr. Henehan,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

Your suggestions with respect to LinkOn and power consumption within the PHY have not been directly adopted, but the BRC believes that changes made in clauses 5.2, Link-on and interrupt indications, 6.1, PHY register map (cable environment) and in the port connection state machines and C code address your concerns;

The illustrations in P1394a follow the isolation practices recommended by the draft standard. Consequently, the BRC believes these to be an adequate example of isolation techniques. Perhaps the alternatives you propose could be more fully explored in subsequent standards efforts;

Additional discussion within the BRC resulted in the modification of your proposal to standardize the backplane PHY register set according to the only extant implementation. The BRC believes that parts manufactured by Texas Instruments comply with the changes adopted;

With respect to the DC currents on VG and VP for nodes that consume cable power, the BRC reviewed the rationale for the inclusion of this statement and believes its intent is to promote good design through the return of current on VG rather than by an alternate path. It is not meant to imply a requirement for isolation. The text below is proposed as a clarification to clause 7.3:

The sum of the DC currents on VG and VP, for any node that consumes cable power, should be less than 50 mA. This does not imply a requirement for galvanic isolation but encourages good design (the return of power supply current *via* VG rather than an alternate path).

Your suggestion that remote PHY command packets for suspend operations be prohibited in any Serial Bus configuration that includes a mix of legacy nodes compliant with IEEE Std 1394-1995 and newer devices that implement the suspend / resume protocols is deemed too extreme by the BRC. We agree that there are pitfalls, as you discuss, but refer you to working group decisions to specify only the mechanisms for suspend / resume. Other specifications for the higher level software that will use these mechanisms is necessary; although beyond the scope of P1394a, standardization efforts are already underway in other for a such as the 1394 Trade Association Energy Conservation Working Group.

In any case, the BRC considers it useful to draw attention to the problem you cite and has added the following text to the informative information in clause 3.5.3 of the revised draft:

NOTE—A Serial Bus configuration that includes nodes compliant with IEEE Std 1394-1995 as well as nodes capable of suspension requires careful analysis by a power manager or other application prior to the creation of a suspended domain. For example, if a remote PHY command

packet is used to create a suspended domain and a legacy node lies on the path between the sender of the packet and the initiator of the suspended domain, the legacy node will block the spread of the suspended domain from the suspend initiator towards the sender of the packet. In addition, the original sender of the packet subsequently will have no means to cause the suspended domain to resume; it is unreachable because the legacy node perceives the connection to the suspended domain as disconnected.

The compilation of the SPEED_MAP registers has been deprecated in P1394a. Expert opinion is that few contemporary bus managers publish an accurate speed map, the additional differentiation between link and PHY speed capabilities permitted by P1394a complicates the situation (as you observe), the collection of the necessary information generates additional Serial Bus traffic at a time when it is least desirable and, finally, the information loses much of its value when IEEE p1394.1 bridges are eventually introduced.

Despite this, IEEE Std 1394-1995 clause 8.4.5, Speed management (cable environment), has been replaced in its entirety in P1394a. The new material mentions the necessity to consult the *link_spd* field in configuration ROM but does not provide the detail you suggest.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Noelle Humenick
Project Editor, Standards Activities
Institute of Electrical and Electronic Engineers
445 Hoes Lane
PO Box 1331
Piscataway, NJ 08855-1331

Dear Ms. Humenick,

Thank you for your editorial review of the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

An introduction has been added to the front material; the proposed text is reproduced below:

(This introduction is not part of the draft standard, IEEE P1394a, Standard for a High Performance Serial Bus (Supplement).)

Standards development is an ongoing process and is, perhaps, never complete. In 1994, the working group responsible for IEEE Std 1394-1995, Standard for a High Performance Serial Bus, reluctantly elected to close the door to new material. Although many enhancements were well understood in principle (some were even making their way into contemporary silicon designs), significant work remained to document the details. Consensus emerged to publish the completed work and later to prepare a supplement. This document is that supplement: it extends and corrects facilities of Serial Bus.

In January, 1996, an informal study group was convened by Dr. Gerald Marazas, Chair of the IEEE P1394 working group. The meeting was held in Dallas, TX, at the same time as a quarterly meeting of the nascent 1394 Trade Association. The topic was unfinished business in Serial Bus; brainstorming quickly identified six major areas of interest. Some of the areas readily resolved into clusters of related activity which became other Serial Bus standards projects still active at the time of writing: P1394.1, Serial Bus to Serial Bus bridges and p1394b, gigabit extensions (including new media) to Serial Bus. The topics that were deemed essentially complete (e.g., the alternate 4-pin cable and connector, the PHY arbitration enhancements and miscellaneous corrections to the 1995 standard) were gathered together under the banner of P1394a. Immediately next month, the P1394a study group met to select a Chair and draft a Project Authorization Request (PAR). The first official meeting of P1394a took place in October, 1996; the working group continued to meet monthly until its last meeting in February, 1998.

The working group organized the new effort as a "supplement" rather than a new Serial Bus standard intended to replace IEEE Std 1394-1995, Standard for a High Performance Serial Bus, in its entirety. This decision was based upon the belief that the changes in P1394a were localized to a few areas and that we would be able to complete our work rapidly if we did not have to reissue the entire standard. In retrospect this was an awkward choice. The reader who wishes to be informed of the current Serial Bus standard is forced to consult both the original standard and this supplement. The working group hopes that in the process of international standardization that it is possible to editorially combine the two documents into a single volume.

P1394a Draft 2.0 failed the sponsor ballot conducted by the IEEE and generated a large number of comments. In an effort to resolve these comments and pave the way for a successful recirculation ballot, the Ballot Response Committee (BRC) was convened by the P1394a Chair, Peter Johansson. It first met in the fall of 1998 and continued meeting into 1999 to complete this revision of the draft standard, which is to be resubmitted to the ballot pool for approval.

The references have been removed to a newly created and renumbered section;

As a consequence of the creation of new section 2, References , the definitions have been moved to section 3 as you suggest. Since there are no abbreviations, the title of the section has been amended; and

Section 3, New features (informative) , is intended to prepare the reader for the exacting technical specifications that follow in the other sections. The BRC believes that readers would not be well served by relocating this material to an annex where it would be easily overlooked. In IEEE Std 1394-1995, an analogous section is titled Summary description and is included in the body of the standard and not relegated to an annex.

We are hopeful that the revised draft succeeds in its recirculation ballot and, if it does, look forward to your assistance with final changes before publication.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

David V. James
3180 South Court
Palo Alto, CA 94306

Dear Dr. James,

Thank you for your comments, for information, on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

Your suggestion to broaden the recommended uses of *resp_type_error* to include cases where the recipient screens *source_ID* has been adopted and the following text added to clause 9.5.4:

In addition to the mandated responses above, nodes should respond with *resp_type_error* in the circumstances described below:

A request packet is received with valid *tcode* and *extended_tcode* values, but the recipient accepts requests only from particular senders, as identified by *source_ID*. Some protocols protect certain addresses from both unintended and malicious interference by requiring a login procedure that identifies the *source_ID* of a valid requester.

Your suggestion to use *resp_type_error* and *resp_address_error* to differentiate between different sorts of unimplemented addresses is rejected. The BRC believes that the fine distinction between whether it is the starting address that is unimplemented or a subsequent part of the address range that is unimplemented does not add value to the error information returned. Additionally, clause 9.5.5 clearly states that both of these types of address error are to be characterized by *resp_address_error*;

A BRC discussion of your proposal that a constant value to be substituted for invalid data CRC in an isochronous packet (stomped CRC) yielded no consensus. The argument in favor of the diagnostic usefulness of such a value was not sufficiently strong to mandate the proposed behavior; and

The BRC is unable to accept your comment on the suspend / resume feature since no text is provided to clarify "all possible corner-case scenarios and failure recovery strategies." Never the less, as a result of other comments, considerable effort has gone into revisions to the clauses that describe suspend / resume in the forthcoming draft.

Thank you for your contribution, along with Jerry Hauck and Farrell Ostler, that resulted in the revised (and much improved!) dual-phase retry protocol in P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Peter Johansson
Congruent Software, Inc.
98 Colorado Avenue
Berkeley, CA 94707

Dear Mr. Johansson,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

The BRC believes that the proposals made in 98-007r0 require significant changes to the port connection state machines which introduce the risk of significant delay in approval of the standard. This BRC does not consider this in the best interests of users of the draft standard. Instead, the following modifications to clause 7.5.4.4, Remote command packet , are suggested:

Because a remote command packet may alter the power state of the addressed PHY, such a packet shall not be transmitted to any device unless the device has indicated, by means beyond the scope of this standard, that its power state may be managed by others. The absence of any such indication shall be interpreted as a refusal to grant power management privileges to others.

NOTE—Although this standard does not define any method for a device to advertise whether or not it participates in power management protocols, configuration ROM may provide the necessary information. If that is the case, simple devices without link and transaction layers (such as power bricks) would be exempt from power management.

The BRC believes that this change adequately addresses your concern that power management not be applied to devices for which it is inappropriate;

Your comment about the PRIORITY_BUDGET register was accepted with modification by the BRC:

Optional, cable environment. This register shall be implemented on nodes that use asynchronous priority arbitration for the primary packets enumerated by table 9-10 and if implemented shall be located at offset 218₁₆ within initial register space.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

David LaFollette
Intel Corporation
MS: SC12-601
3600 Juliette Lane
Santa Clara, CA 95052

Dear Mr. LaFollette,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

Modifications to the C code to fix problems with concatenated packets after unexpected end of data have been extended by the BRC to address other concerns related to null packets. We think that the additional changes resolve your comment;

Changes have been made to the port connection state machines so that the remote command and confirmation packets for a reset operation are handled indivisibly; and

The BRC believes that in addition to clarifying that the consuming node shall avail itself of no more than 1.5 A of cable power that the power supplying node shall be constrained on a *per port* basis according to agency requirements (in the United States the nominal limit is believed to be 3 A). Table 7 1 was updated to reflect this new requirement.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926

(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Tuvia Lamdan
The Weizmann Institute
PO Box 26
Rehovot, 76283
Israel

Dear Mr. Lamdan,

Thank you for your comments, for information, on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

The editor understands well your comment about consistency within the draft and has endeavored to improve upon it. Much of the difficulty stems from the lack of a uniform style within IEEE Std 1394-1995; within the constraints imposed by a supplement to a standard that will continue in force it is impossible to entirely cure the problem;

Your second comment addresses related issues, but these are easier to clarify. IEEE P1394a is intended to be read in conjunction with IEEE Std 1394-1995; it is not a stand-alone document; and

The value of 2.75 μ s in the second paragraph of page 47 is correct; *per table 5 1*, this is the minimum time necessary for the link to deassert LPS in order to guarantee its recognition by the PHY;

The majority of the other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Gerald E. Laws
Texas Instruments, Inc.
PO Box 655474
7839 Churchill Way, MS 3999
Dallas, TX 75251

Dear Mr. Laws,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement).

The form of P1394a, a supplement to IEEE Std 1394-1995, was chosen initially because of a belief that the work was readily separable from the existing standard. The working group was of the opinion that we could complete our work faster if we restricted ourselves to a "supplement", in contrast to a comprehensive revision of the entire standard.

All of us who have worked on P1394a agree with the observation that P1394a is difficult to use because it requires careful interpolation into the existing text of IEEE Std 1394-1995. We expect that this difficulty will be remedied with the approval of Serial Bus as an international standard by ISO/IEC, at which time the editorial work necessary to combine the current standard and its supplement into a single document will be undertaken.

Note that it remains possible to comply with IEEE Std 1394-1995; the current standard is not withdrawn. If P1394a is approved as a standard, it will also be possible to comply with its additional or updated specifications.

With respect to your two particular comments:

The reference to draft standard P1394b is a reference to a supplement to the original standard. Compliance with this supplement is in addition to compliance with IEEE Std 1394-1995;

The working group, after considerable discussion, concluded that design guidance on electrical safety issues is beyond the scope of the draft standard. The language you cite remains to alert the reader that issues exist.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Gerald A Marazas
IBM PC Company
3039 Cornwallis Road
Research Triangle Park, NC 27709-2195

Dear Mr. Marazas,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

The intent of your comment about the persistence of LinkOn in the face of bus reset has been adopted with slight modification (please note that *Watchdog* is the new name of the *Resume_int* bit):

Once asserted, the LinkOn signal shall persist so long as the LPS signal is logically deasserted and may persist so long as the PHY register *LCtrl* bit is zero—with one exception. A bus reset shall clear the LinkOn signal unless a) the PHY register *Port_event* bit is one or b) the PHY register *Watchdog* is one and a loop, power failure or timeout condition exists.

The BRC believes that in addition to clarifying that the consuming node shall avail itself of no more than 1.5 A of cable power that the power supplying node shall be constrained on a *per port* basis according to agency requirements (in the United States the nominal limit is believed to be 3 A). Table 7 1 was updated to reflect this new requirement.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Joseph R. Marshall
Lockheed Martin Federal Systems
9500 Godwin Drive, MS 012
Manassas, VA 20110

Dear Mr. Marshall,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). I appreciate your careful reading, which caught a number of editorial mistakes; most have been corrected *per* your suggestions, some I have left to the discretion of the IEEE editors responsible for the final edits.

In response to particular comments you made:

The details of line state encoding for TPA and TPB are specified in IEEE Std 1394-1995, clause 4.3.3. P1394a is a supplement to the existing standard and does not repeat information unless a correction is made or it is necessary for the sake of clarity;

Since P1394a permits a maximum of 16 ports on a single (cable environment) PHY, it was a mistake to show the PHY register field *Total_Ports* as four bits wide. The field size has been corrected to five bits in the forthcoming draft for the recirculation ballot;

All of the design and review effort that went into clause 5.9, "Electrical characteristics", was intended for the cable environment. Some of the DC values may, in fact, be applicable to the backplane environment but because they have not been reviewed the BRC chose to add "(cable environment)" to the heading of clause 5.9; and

Although it may be possible to design PHYs for the backplane environment at S100, the necessary development and critical review have not been undertaken within the scope of P1394a.

The BRC's understanding of your "backpanel" implementation is that it uses single-port backplane PHYs but then adds a switch that permits one of multiple buses to be selected. It is the added value of the switch itself, not the backplane PHY architecture specified by IEEE Std 1394-1995, that permits the device to present the appearance of multiple ports. During normal operations (from the standpoint of the standard) only one of the swtichable ports is active and thus the PHY is still a single-port PHY.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Gene Milligan
Seagate Technology
PO Box 12313
OKM251
Oklahoma City, OK 73157-9705

Dear Mr. Milligan,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). Your customary careful review is greatly appreciated by both the BRC and me. In response to your particular comments:

The distinction between behaviors of reserved field and bits and the rules for the evaluation of lock requests has been strengthened by the removal of the lock request rules to a new clause in section 9;

The BRC has attempted to clarify the precedence given different normative descriptions by deleting clause 1.6.12 and inserting the following text immediately before table 7-17:

The clauses that follow normatively describe the operation of the cable physical layer by means of state machine diagrams, C code and expository text in the body of the standard (which includes the notes that accompany the state machine diagrams but excludes any text within figures or tables). In case of conflict, precedence shall be given first to the state machine diagrams, second to the C code and last to the expository text.

The definition of *reserved* included in P1394a is the result of many discussions (some of them within other groups, such as NCITS T10, in which you participated) that grappled with the difficult issues of when to check field values and when to ignore them. This definition differentiates between reserved fields and reserved values within defined fields. The predicate is that future standards designers will craft new fields so that the effects on legacy devices unaware of the new fields are harmless; it is less clear that it is possible to comply with this guideline when crafting a new value for an existing field. For example, if the field specifies a command or operation, how is the recipient to ignore the new value?

Although other workable definitions of *reserved* likely exist, the BRC is satisfied with the definition contained within P1394a;

Unless an earlier citations exists of which the BRC is unaware, credit is due to John Fuller's impish recollection of an definition of an acronym;

The definition of an originating port has been modified as follows:

originating port: A transmitting port on a PHY which has no active receiving port. The source of the transmitted packet is either the PHY's local link or the PHY itself.

In Webster's Ninth New Collegiate Dictionary, I find the following within the definition for ENSURE:

ENSURE, INSURE and ASSURE are interchangeable in many contexts where they indicate the making certain or inevitable of an outcome, but INSURE sometimes stresses the taking of necessary measures beforehand...

I find the additional connotation of INSURE applicable; it also comports with my teachers' instruction that INSURE is favored over ENSURE in contemporary American usage. This is perilously close to a religious dispute, so I will cede the final decision to the IEEE project editors;

The BRC believes that your confusion about the applicability of P1394a section 4, "Alternative cable media attachment specification", is resolved by changes to the paragraph in question:

Except as superseded by material in this supplement, all clauses in section 4 of IEEE Std 1394-1995, "Cable physical layer specification," apply to alternative 4-pin cables and connectors. With respect to these alternative cables and connectors, only, this section entirely replaces clause 4.2.1 of IEEE Std 1394-1995, "Media attachment." With respect to the standard 6-pin cables and connectors, section 4 of IEEE Std 1394-1995 is not affected in any way by this supplement.

Nothing about IEEE Std 1394-1995 is changed with respect to standard (6-pin) connectors and cables. For alternate (4-pin) connectors and cables only clause 4.2.1 is entirely replaced; all the other provisions of section 4 are equally valid for both 4- and 6-pin variants;

The intent of your comment about the usage of *constant* and *variable* in clause 7.7 is unclear to the BRC. With the exception of `force_root`, which is a variable that may be either TRUE or FALSE, everything referenced within table 7-14 is constant;

The absence of figure B-1, "Differential test fixture schematic", is an artifact of the production of the PDF file. The figure is present in the FrameMaker source manuscript and will be present in the printed standard when published by the IEEE; and

A new definition of *ping* has been added:

ping: A term used to describe the transmission of a PHY packet to a particular node in order to time the response packet(s) provoked.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Kiyoshi Miura
Sony Corporation
Platform SOC Solution Center
Ohsaki Gate City West Tower 9F
Shinagawa-ku 1-11-1
Tokyo, 141-0032 Japan

Dear Miura-san,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your comments:

The DIRECT input for a PHY is mandatory even though the analog input is optional for a link. This is so that discrete PHYs may be used in designs with or without isolation; the designer need not be concerned to order a particular variety of PHY. As you point out, the methods used to achieve galvanic isolation, when necessary, are left to the designer but this does not change the usefulness of a standard PHY suitable for all designs;

Your comment about the LReq rules deserves some explanation; perhaps the introduction of asynchronous stream packets has caused some confusion. Isochronous requests are not permitted outside of the isochronous period; there is no way to transmit a "loose isochronous" packet. As you correctly observe, this is an asynchronous packet and shall be transmitted only after fair or priority asynchronous arbitration. The term "loose isochronous" describes whether or not a link will permit a reception of a *tcode* A₁₆ packet outside of the isochronous period. Such a condition might arise if the sender of the packet saw the cycle start packet that commenced the isochronous period but the recipient did not (perhaps the cycle start packet was corrupted by the time it reached the recipient). "Loose" reception of *tcode* A₁₆ packets can be useful to isochronous and is required for asynchronous streams.

The BRC believes that no additional LReq rules are necessary to specify correct operations;

When a PHY receives a packet without speed signaling, the assumed speed is either S100 (if this is the first packet received after an arbitration gap) or else the speed of the preceding packet. The BRC has modified the text in 7.10.2 immediately below table 7-23 as follows:

Starting data reception requires initializing the data resynchronizer and sampling the speed signal from the sender of the data. In the absence of a speed signal, the PHY interprets the speed as either S100 or else the speed of the immediately preceding concatenated packet. At the same time, the node starts the transmitting ports by sending a special data prefix signal and repeating the received speed code. As in the `start_tx_packet()` function, the node must do the speed signaling exchange for each transmitting port.

The interrupt events when a port's connection status changes are correctly defined by the C code. The definition of `Int_enable` in table 6-1 has been updated accordingly:

Port event detect. The PHY sets this bit to one if any of *Bias* (unless the port is disabled), *Connected*, *Disabled* or *Fault* change for a port whose `Int_enable` bit is one. The PHY also sets this bit to one if resume operations commence for any port and *Watchdog* is one. A write of one to this bit clears it to zero.

Your comment on the timing guarantees enforced by repeating ports is accepted. Instead of making a specific reference to MIN_IDLE_TIME (which text is deleted) , the responsibilities of repeating ports are broadened to include relevant timing requirements. The text below has been added immediately before table 7-14:

Repeating ports shall be designed to account for clock frequency and phase differences and still guarantee relevant times from the table below.

The BRC has reviewed your comment suggesting that fair requests must be used when transmitting "loose" isochronous packets. It is important to note that the expression "loose isochronous" may be misleading. "Loose isochronous" was a term coined for IEEE 1394-1995 link designs which allowed a link to receive isochronous packets outside of the isochronous interval. However, stream packets intended for the isochronous period should never be transmitted unless a cycle start packet is observed.

Your analysis is correct: arbitration for isochronous packets shall occur only during the isochronous interval (as required by table 5-15), asynchronous stream packets shall use asynchronous arbitration (as documented in clause 8) and "loose isochronous" applies to reception, never transmission (as described in detail in clause 8.2). The BRC feels no additional clarification is required to describe proper operation and avoid the packet corruption you hypothesize.

The BRC hopes that these clarifications and modifications to the forthcoming draft of P1394a are sufficient for you to cast an affirmative vote on the recirculation ballot. If you think that any of your concerns have not been satisfactorily addressed, please contact me.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Farrell Ostler
Philips Semiconductors
9201 Pan American Freeway NE, MS 55
Albuquerque, NM 87133

Dear Mr. Ostler,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

With respect to your proposal that the link refrain from issuing bus requests during the interval which starts with bus reset and ends when either a subaction gap is observed or the PHY transmits its own self-ID packets, the BRC believes the restriction is unnecessary.

As you observe, the PHY cancels all bus requests upon transmission of self-ID packets. Since these packets are simultaneously transferred to the link, it too cancels any outstanding bus requests (see Table 5-16). Any previously outstanding isochronous or immediate requests are canceled by the bus reset indication (again, see Table 5-16) and, *per* Table 5-15, shall not be reissued by the link until the start of next isochronous period or in response to reception of a primary packet.

One related circumstance the BRC discussed is the transmission of self-ID packets in response to a ping packet. The PHY cancels all outstanding bus requests but the link cancels only fair and priority requests upon transfer of the local self-ID packets. This inconsistency is removed by requiring asynchronous arbitration for ping and remote access or command packets:

PHY packets originated by the link shall be transmitted only if the bus has been granted as the result of either fair or priority arbitration.

Consequently, it is impossible for immediate or isochronous requests to be pending when self-ID packets are transmitted.

With this change and the existing specifications of Table 5-15, the BRC believes that your concerns are adequately resolved.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

The BRC extends its appreciation for the effort expended by you, Jerry Hauck and David James to propose revisions to the dual-phase retry protocol incorporated in P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

William Prouty
PO Box 2150
Carmichael, CA 95609

Dear Mr. Prouty,

Thank you for your thoughtful comments, for information, on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement).

As you are aware, the entire issue of galvanic isolation was discussed many times during the P1394a working group meetings. The solution you propose to a hypothetical shock hazard poses cost, emissions, and ESD problems for which there are no widely accepted solutions in the industry at this time. The P1394a draft standard comments on the potential for galvanic problems and suggests that additional design efforts may be appropriate in some circumstances, e.g., industrial and medical applications.

After careful consideration, the BRC has chosen not to adopt your suggestions for changes to Annex A, Cable environment electrical isolation .

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Joseph M. Pumilio
XCOMM/Soft Solutions, Inc.
9921 Carmel Mountain Rd., Suite 14
San Diego, CA 92129

Dear Mr. Pumilio,

Thank you for your comments, for information, on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

There are no plans to make PHY or other state machines available in VHDL. The BRC believes that the C language pseudocode is appropriate to the supplement, since it follows the editorial conventions of IEEE Std 1394-1995; and

When P1394a is sent out for a recirculation ballot, you will receive a revised draft for your review and vote.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

John Rogers
11604 104th Avenue NE
Kirkland, WA 98034

Dear Mr. Rogers,

Thank you for your comments, for information, on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

P1394a has inherited some editorial inconsistencies from its parent, IEEE Std 1394-1995, that are more troublesome to fix than to leave unaltered. Your observation about the varying capitalization of Boolean is a case in point. In large measure, the BRC has chosen to leave these matters to the discretion of the editor; and

The meaning and usage of an asynchronous stream packet whose *data_length* field is zero is left to mutual, pre-arranged agreement between the sender and recipient(s), just as is the case for isochronous stream packets standardized by IEEE Std 1394-1995.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Bradley Saunders
Xircom, Inc.
2300 Corporate Center Drive
Thousand Oaks, CA 91320

Dear Mr. Saunders,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your comments:

The BRC is unable to accept your preferred solution to the problems of maximum output voltage, but P1394a has been revised to limit output voltage to 30 V (a resolution you consider acceptable, according to your ballot comments); and

As a result of a number of comments on interrupts for disabled ports, the BRC has made several revisions to clause 7.10.4, "Port connection", and to other clauses affected. We anticipate that the changes are an acceptable resolution of your second comment.

Your request to correct a spelling error is accepted and reflected in the new draft.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com

June 30, 1999

Robert G Stewart
Stewart Research Enterprises
1658 Belvoir Drive
Los Altos, CA 94024

Dear Mr. Stewart,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your comment:

The BRC agrees that the information in table 5-13 appears incomplete without connecting it with the clause in IEEE Std 1394-1995 that precisely defines the transmission speeds. Consequently, the text above table 5-13 has been modified as shown below.

The request speed field is encoded as shown in table 5-13. The actual data rates for the S100, S200 and S400 speed codes are specified by IEEE Std 1394-1995 clause 4.2.3.1. Although encoding for speeds up to S3200 is specified below, the PHY/link interface defined by this supplement does not support speeds in excess of S400.

Throughout the document we have attempted to make uniform reference to the logical data rates S100, S200 and S400. The data rates supported by P1394a have not changed since IEEE Std 1394-1995; because P1394a is a supplement to the original standard, unaltered material usually is not repeated.

The BRC hopes that these changes are adequate to receive your affirmative vote in the forthcoming recirculation ballot. If you have additional comment, please contact us.

Incidentally, once P1394a is approved as an American National Standard we hope to use the simultaneous international adoption of both IEEE Std 1394-1995 and P1394a as an opportunity for the editorial work necessary to combine the two into one volume. We realize that the choice to publish P1394a as a supplement has proved more cumbersome than we anticipated and look forward to improving the combined standard.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Michael D. Johas Teener
Zayante, Inc.
269 Mt. Hermon Road, #201
Scotts Valley, CA 95066-4000

Dear Mr. Teener,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your comments regarding the isochronous period:

The definition of CYCLE_TOO_LONG in IEEE Std 1394-1995 is arguably correct. The BRC believes that the usefulness of the CYCLE_TOO_LONG event exists when two active buses are joined and their combined isochronous allocation exceeds 125 μ s. For a single bus, the default value of BANDWIDTH_AVAILABLE after bus reset is sufficient to police the use of the isochronous period.

Also, the suggested introduction of a new constant, MAX_ISOCHRONOUS_BANDWIDTH (100 μ s), and the redefinition of the CYCLE_TOO_LONG event to reference the new constant could have undesirable side effects. In a constrained environment, it is possible to design an application that successfully utilizes more than 80% of the nominally available isochronous period. If the change you suggest were made, compliant link designs would be unusable by such an application, which would require more costly custom designs.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

David Thompson
Lucent Technologies
1247 South Cedar Crest Boulevard
Allentown, PA 18103

Dear Mr. Thompson,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). All of the clauses in the draft on which you commented received comments from other balloters. The BRC has worked diligently to synthesize changes to the draft that reflect the best ideas from all of the comments; we believe that you will find the intent of all of your comments accepted even if some literal details differ.

Please review the revised draft of P1394a, prepared for the forthcoming recirculation ballot, and let us know whether or not the changes constitute satisfactory acceptance of your comments. We hope you will be able to vote affirmatively on the revised draft.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Paul Walker
4Links for Technical Help
PO Box 816
Two Mile Ash
Milton Keynes, MK8 8NS
United Kingdom

Dear Mr. Walker,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). The BRC has read and reviewed your epistle with considerable pleasure – it is always a delight to find thoughtful comment commingled with a dry wit. Unfortunately, we are unable to accept most of your suggestions.

If that seems a trifle abrupt, permit us to share our reasoning:

We agree that IEEE Std 1394-1995 and P1394a are more difficult to understand as separate documents, but our scope for action is restricted by the Project Authorization Request (PAR) that initiated P1394a. At the time, the work was thought to be easily separable from the 1995 standard. This is still the case for significant parts of P1394a which replace their corresponding clauses in the earlier standard in their entirety, but it is less so for others.

In our judgement, we would do a disservice to the users awaiting P1394a in order to make the changes you recommend. Once P1394a is approved as an American National Standard we hope to use the simultaneous international adoption of both IEEE Std 1394-1995 and P1394a as an opportunity for the editorial work necessary to combine the two into one volume;

You assert that "there is absolutely no point in extracting the last ounce of performance from a shared medium that fundamentally does not scale." Were we to adhere to your implied suggestions and strip the arbitration enhancements from P1394a, we would fail to meet the expectations of users in the real world. The overhead penalty in Serial Bus does not scale but newer devices that operate at faster and faster speeds are in greater need of the reclaimed bandwidth. We recognize that these methods are palliative for the current Serial Bus technology – that is why IEEE P1394b adopts arbitration that scales at increased speeds and why IEEE P1394.1 addresses scalability as more nodes are added – but believe that it would be irresponsible to provide no interim solution;

The P1394a working group considered the idea that the insertion or removal of a device should not necessarily cause a reset of the entire bus (see working document 98-001r0 for a description of one approach). But the working group concluded that the solutions introduced significant added complexity. The P1394a draft reflects the working group's belief that, on balance, other improvements, notably the arbitrated (short) bus reset, reduce the disruption caused by bus reconfiguration to acceptable levels. The BRC does not wish to overturn the action taken by the working group;

The idea that we should pursue a "simple serial bus" is hard to refute, but consider that *"One man's mean is another man's Poisson."* What is "simple", after all? It is a subjective term

and one that must encompass the problem statement before the problem solution can be judged simple or complex. The only yardstick for simplicity your comment provides is reference to completely different technologies which are outside of the scope of P1394a;

One hesitates to ascribe too much wisdom to the collective decisions of individual companies, but the fact that Serial Bus has found its widest adoption to date by consumer electronics companies belies your comment. On the other hand, we think many documents, including P1394a, could benefit from your warning label. Fortunately, most consumers don't read the standards, they just buy the products built to the standard;

Serial Bus follows the conventions of ISO/IEC 13213:1994 (originally IEEE Std 1212-1991) for the identification of vendors in configuration ROM. The BRC believes these to be adequate;

The editor would like to acknowledge that no discourtesy to P1394a balloters was ever intended by the introductory material in section 9. His only intent, over the time it took to prepare the draft standard for ballot, was to shield himself from complaints that all errors in IEEE Std 1394-1995 were not corrected. Now that we approach final approval, your comment is accepted with the inclusion of the modified text below:

Since the publication of IEEE Std 1394-1995 a number of ambiguities, technical errors and typographical errors have been identified by implementers and other readers. The impact of most is minor and in many cases a thoughtful reading of the whole of the standard can lead the reader to the correct interpretation.

This section addresses essential clarifications and *corrigenda* in no particular order.

With respect to electrical isolation, the BRC has chosen a less drastic solution than the two you propose. The offending text has been removed from annex clause A.2;

Most of the normative definitions regarding power distribution have been left to standards work initiated in other groups, for example the 1394 Trade Association Energy Conservation working group (ECWG). The scope for P1394a agreed by the working group excluded most power distribution work items because the working group believed a) that their anticipated completion was too far in the future for P1394a and b) a minimal set of power distribution issues essential to P1394a could be identified and specified by the draft standard. Messrs. Bard and Wooten thank you for your support (they have participated in the BRC) and encourage your participation in both the ECWG and an expected IEEE project that will address power distribution on Serial Bus; and

For reasons mentioned above, it would be irresponsible to omit information that permits users to obtain the best possible performance out of any particular Serial Bus topology. Fortunately, it will not be users that have to read and comprehend annex clause C.2, but implementers of bus managers. In any event, the material has undergone substantial revision; the BRC hopes you find it more usable.

Thank you very much for a careful reading of a draft standard whose very nature seems to be at odds with many of your technical judgements. The BRC understands that, upon first examination, you may not find these responses sufficient to convince you to cast an affirmative vote in the P1394a recirculation ballot. On the other hand, were we to accept your comments we would have to go far outside the scope of the PAR. In the light of this, we urge you to reconsider your position on the ballot.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926

(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1998

Colin Whitby-Strevens
Zayante, Inc.
269 Mt Hermon Rd., Suite 201
Scotts Valley, CA 95066

Dear Dr. Whitby-Strevens,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your particular comments:

Your suggestion to not provide interrupt notification when a disconnection occurs on a disabled port is rejected because it alters the behavior of the port when it becomes enabled. Although both behaviors are plausible, a change at this point would penalize early adopters of the draft standard for little gain (behavioral equivalence with P1394b);

With respect to gap count stickiness, this is an important and often misunderstood concept. The forthcoming draft has been revised in three areas to emphasize the correct procedures: a) any write to PHY register one sets the `gap_count_reset_disable` variable TRUE, b) unless the value of `gap_count` in such a write is 63, the necessity to quickly initiate a bus reset and c) the preferred use of the PHY configuration packet (followed by a bus reset) when necessary to set `gap_count`; and

Your proposal to zero `arb_timer` on the T0:T1 transition is rejected because it assumes a particular implementation. Other implementations are possible that do not require this action.

All other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee

98 Colorado Avenue
Berkeley, CA 94707

(510) 527-3926
(510) 527-3856 FAX

pjohansson@aol.com

June 30, 1999

Patrick Yu
NEC Electronics, Inc.
2880 Scott Blvd., MS: SC2400
Santa Clara, CA 95050

Dear Mr. Yu,

Thank you for your ballot response on the proposed standards draft for IEEE Project P1394a, Standard for a High Performance Serial Bus (Supplement). In response to your second comment:

We believe that the modified definition of DATA_PREFIX_TO_GRANT addresses your concerns:

When a node originates a concatenated packet, the time from the start of TX_DATA_PREFIX at any port to the PHY's assertion of Grant on Ctl[0:1].

Both of the other comments you submitted have been accepted, subject to editorial revision, and are reflected in the forthcoming draft of P1394a.

Sincerely,

Peter G. Johansson
Chair, IEEE P1394a Ballot Response Committee
98 Colorado Avenue
Berkeley, CA 94707
(510) 527-3926
(510) 527-3856 FAX
pjohansson@aol.com